*Cancel claims 1-30*

31. A method of characterizing colors for reproduction between a first device and a second device, the method comprising:

normalizing first tristimulus values indicative of a color of the first device using local black point values;

transforming the normalized first tristimulus values to obtain color values indicative of modified cone responses of the human eye;

chromatically adapting the color values from a local condition to a reference condition; and

transforming the adapted color values to obtain second tristimulus values.

32. The method of claim 31 wherein a neutral axis of the local condition is mapped to a neutral axis of the reference condition.

33. The method of claim 31 wherein normalizing the first tristimulus values includes dividing by a difference between a local luminance value and a local black point luminance value.

34. The method of claim 33 wherein transforming the adapted color values includes multiplying the adapted color values by a reference white point luminance value divided by a difference between a local white point luminance value and the local black point luminance value.

35. The method of claim 31 wherein transforming the normalized first tristimulus values is performed using a Bradford transformation.

36. The method of claim 35 wherein normalizing the first tristimulus values and transforming the normalized first tristimulus values are performed according to

$$\begin{bmatrix} R_1 \\ G_1 \\ B_1 \end{bmatrix} = M_b \begin{bmatrix} (X_1 - X_{1k})/(Y_1 - Y_{1k}) \\ (Y_1 - Y_{1k})/(Y_1 - Y_{1k}) \\ (Z_1 - Z_{1k})/(Y_1 - Y_{1k}) \end{bmatrix}$$

where $[X_{1k}, Y_{1k}, Z_{1k}]$ is the local black point, $X_1$, $Y_1$, and $Z_1$ are the first tristimulus values,

$$M_b = \begin{bmatrix} 0.8951 & 0.2664 & -0.1614 \\ -0.7502 & 1.7135 & 0.0367 \\ 0.0389 & -0.0685 & 1.0296 \end{bmatrix}, \text{ and}$$

$R_1$, $G_1$, and $B_1$ are the color values indicative of modified cone responses of the human eye.

37.  The method of claim 36 wherein chromatically adapting the color values is performed according to

$$R_{ret} = (R_{rw}/R_{lw}) \times R_1$$
$$G_{ret} = (G_{rw}/G_{lw}) \times G_1$$
$$B_{ret} = Sign[B_1] \times (B_{rw}/B_{lw}{}^\beta) \times |B_1|^\beta$$
$$\beta = (B_{lw}/B_{rw})^{0.0834}$$

where $R_{rw}$, $G_{rw}$, and $B_{rw}$ are RGB values of a reference white point, $R_{lw}$, $G_{lw}$, and $B_{lw}$ are RGB values of a local white point.

38.  The method of claim 37 wherein transforming the adapted color values to second tristimulus values is performed according to

$$\begin{bmatrix} X_{ret} \\ Y_{ret} \\ Z_{ret} \end{bmatrix} = M_b^{-1} \begin{bmatrix} R_{ret} \times Y_1 \times Y_{rw}/(Y_{lw} - Y_{lk}) \\ G_{ret} \times Y_1 \times Y_{rw}/(Y_{lw} - Y_{lk}) \\ B_{ret} \times Y_1 \times Y_{rw}/(Y_{lw} - Y_{lk}) \end{bmatrix}.$$

39.  The method of claim 31 wherein transforming the normalized first tristimulus values is performed using a von Kries transformation.

40.  The method of claim 39 wherein

$$\begin{bmatrix} X_{ret} \\ Y_{ret} \\ Z_{ret} \end{bmatrix} = M_v^{-1} \begin{bmatrix} L_{rw} & 0 & 0 \\ 0 & M_{rw} & 0 \\ 0 & 0 & S_{rw} \end{bmatrix} \begin{bmatrix} 1/(L_{lw}-L_{lk}) & 0 & 0 \\ 0 & 1/(M_{lw}-M_{lk}) & 0 \\ 0 & 0 & 1/(S_{lw}-S_{lk}) \end{bmatrix} M_v \begin{bmatrix} X_1 \\ Y_1 \\ Z_1 \end{bmatrix}$$

where

$$M_v = \begin{bmatrix} 0.38791 & 0.68898 & -0.07868 \\ -0.22981 & 1.18340 & 0.04641 \\ 0 & 0 & 1.0 \end{bmatrix}$$

and where $[L_{rw}, M_{rw}, S_{rw}]$ are LMS (long, medium, and short wavelength band) values of the reference white, $[L_{lw}, M_{lw}, S_{lw}]$ are LMS values for local white, $[L_{lk}, M_{lk}, S_{lk}]$ are LMS values for local black, $X_l$, $Y_l$, and $Z_l$ are the first tristimulus values, and $X_{ref}$, $Y_{ref}$, and $Z_{ref}$ are the second tristimulus values.

41. The method of claim 31 wherein the first device is a print device and the second device is a print device, tristimulus values of a common illuminant are used as reference tristimulus white values for both print devices, media white tristimulus values of each print device are used as local tristimulus white values for both print devices, and Bradford-type adaptations are used for both print devices to implement media-relative colorimetry.

42. The method of claim 31 wherein the first device is a print device and the second device is a display device, tristimulus values of a reference illuminant are used as reference tristimulus white values, media white tristimulus values of the print device are used as local tristimulus white values for the print device, monitor white tristimulus values of the display device are used as local tristimulus values for the display device, and Bradford-type adaptations are used for both the first and second devices to implement media-relative colorimetry.

43. The method of claim 31 wherein the first device is a print device and the second device is a display device, tristimulus values of a reference illuminant are used as reference tristimulus white values, media white tristimulus values of the print device are used as local tristimulus white values, monitor white tristimulus values of the

display device are used as local tristimulus values for the display device, Bradford-type adaptation is used for the display device, and absolute CIE-Lab is used for the print device to implement absolute colorimetry.